

NON-PUBLIC?: N
ACCESSION #: 9011050112
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Seabrook Station PAGE: 1 OF 04

DOCKET NUMBER: 05000443

TITLE: Licensee Event Report (LER) No. 90-015-01: Turbine Trip With
Reactor Trip Due to Ground Fault Relay Actuation
EVENT DATE: 06/20/90 LER #: 90-015-01 REPORT DATE: 10/22/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: POWER LEVEL: 030

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Allen L. Legendre Jr., Lead TELEPHONE: (603) 474-9521
Engineer - Compliance, Ext. 2373

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On June 20, 1990, at 4:39 p.m., while in MODE 1 at 30% reactor power and increasing, a turbine-generator trip with reactor trip occurred. The trip was initiated by the actuation of a main generator ground fault relay designed to protect the last 5% of generator windings from a ground fault. An Emergency Feedwater (EFW) actuation also occurred due to low-low steam generator narrow range level. Steam generator "A" EFW isolated due to high EFW flow one minute into the event.

The turbine-generator tripped due to the ground fault relay actuating. All the applicable trips and interlocks associated with a turbine generator, reactor trip and feedwater isolation functioned as designed. Parameters associated with the reactor were reviewed by the on-shift reactor engineer and determined to be normal. The EFW isolation occurred when the turbine driven pump came up to full speed, thus creating a

situation where both EFW pumps were supplying feedwater simultaneously.

The root cause for the actuation of the ground fault relay has been determined to be incorrect relay settings provided by the vendor. A Minor Modification (MMOD) will be issued to revise the relay settings and bypass the trip function of the relay. Additional corrective actions include revising the EFW isolation setpoint as well as reviewing and updating emergency operating procedures.

END OF ABSTRACT

TEXT PAGE 2 OF 4

On June 20, 1990, at 4:39 p.m. EDT, a turbine-generator trip with reactor trip occurred while plant load was being increased from 30% reactor power. The turbine trip was initiated by a main generator ground fault relay actuation.

Description of Event

Prior to the event, Work Request 90W003354 was initiated to periodically monitor ground fault relay 64 (100%) TG-1. This relay, which is an additional protection function not required by the generator manufacturer, protects the last 5% of the generator windings using a neutral transformer secondary circuit. The relay monitors the third harmonic of the generator output frequency through a bandpass filter arrangement. A ground fault will upset the third harmonic and de-energize the relay, causing the actuation of the generator primary protection breaker lockout relay. In order for the ground fault relay to perform its monitoring function, there must be sufficient current through the neutral transformer secondary circuit. Sufficient current for the relay to self-activate its monitoring function occurs at approximately 30% power. Ground fault relay 64 (100%) TG-1 was being monitored because of a vendor recommendation to substantiate the validity of previously calculated settings.

When the trip occurred, reactor power was at approximately 30% and was being increased, using the load limiter to maintain a rate of less than 5% per hour. The initiating event was recorded as, "Generator Neutral Volts High". This caused a main generator breaker lockout, initiating the turbine-generator trip with reactor trip. An Emergency Feedwater (EFW) BA! actuation occurred as designed due to low-low steam generator narrow range level.

The Unit Shift Supervisor (USS), entered. Emergency Operating Procedures E-0 and ES 0.1, "Reactor Trip or Safety Injection" and "Reactor Trip

Response" responding to the reactor trip/turbine trip without a safety injection. Approximately one minute into the event, steam generator "A" EFW isolated due to high EFW flow on both trains. Once the other three steam generators reached levels greater than 25%, the steam turbine driven EFW pump was shutdown. This was done to minimize cooldown of the Reactor Coolant System (RCS) AB! due to steam flow going to the EFW turbine. The electric EFW pump and startup feed pump continued to feed the steam generators.

Safety Consequences

The turbine-generator tripped due to the ground fault relay actuating. All the applicable trips and interlocks associated with a turbine-generator trip, reactor trip and feedwater isolation functioned as designed.

EFW actuation occurred as designed due to low-low steam generator narrow range level. The isolation of EFW to steam generator "A" due to high flow occurred when the turbine driven pump came up to full speed, creating a situation where both EFW pumps were supplying feedwater simultaneously. The setpoint for EFW isolation on high flow was 425 GPM.

TEXT PAGE 3 OF 4

All operator actions were determined to be appropriate to ensure the safety of the plant. Parameters associated with the reactor were reviewed by the on-shift reactor engineer and determined to be normal. At no time during this transient was there any impact on the health and safety of plant employees or the public.

Root Cause

The root cause for the actuation of the ground fault relay has been determined to be incorrect relay settings. These relay settings were based on assumed third harmonic voltage levels which were provided by the vendor. The actual values were lower than expected.

Corrective Actions

After the trip and the plant was placed in HOT STANDBY in accordance with operating procedure 0S1000.11, "Post Trip to HOT STANDBY", an event evaluation, root cause analysis, and Human Performance Enhancement System (HPES) analysis were initiated and completed before restart of the reactor.

A Temporary Modification (TMOD) was implemented to monitor the relay and bypass the trip function. This relay protection is not required by the generator manufacturer. Voltage and current data collected has shown the relay to be operating properly, and that the setpoint was correct based on the information available at that time. Further monitoring of the relay has shown that the relay trips when first activated at approximately 30% power. The relay then resets at a high power level.

A Minor Modification (MMOD) will be issued to permanently revise the relay settings and bypass the trip function of the relay. The bases for the MMOD are:

- o This relay protection is not required by the generator manufacturer.
- o The overall relaying scheme is adequate to protect and isolate the generator.
- o The operating experience of other users of this relay support its bypass.
- o Actual generator neutral voltage readings were taken during power ascension testing. Based on these actual readings new relay setpoints have been determined.

This modification is expected to be completed prior to startup following the first refueling outage. A Minor Modification (MMOD) was implemented to revise the setpoint for automatic isolation of a faulted steam generator from 425 to 525 GPM. This MMOD included rescaling the EFW transmitters and associated indicators and recorders.

TEXT PAGE 4 OF 4

In addition, Operations Department Personnel have reviewed and updated emergency operating procedures to include further guidelines associated with RCS cooldown.

Plant Conditions

At the time of this event, the plant was in MODE 1, Power Operation, at 30% power, with an RCS temperature of 561 degrees Fahrenheit and pressure of 2235 psig.

This is the first event of this type at Seabrook Station.

ATTACHMENT 1 TO 9011050112 PAGE 1 OF 1

New Hampshire Ted C. Feigenbaum
Yankee President and
Chief Executive Officer

NYN-90188

October 22, 1990

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

References: Facility Operating License No. NPF-86, Docket No. 50-443

Subject: Licensee Event Report (LER) No. 90-015-01: Turbine Trip
With Reactor Trip Due to Ground Fault Relay Actuation

Gentlemen:

Enclosed please find Licensee Event Report (LER) No. 90-015-01, for
Seabrook Station. This submittal supplements LER 90-015-00 which
documents an event which was identified on June 20, 1990, and is being
reported pursuant to 10CFR50.73(a)(2)(iv).

Should you require further information regarding this matter, please
contact Mr. Allen L. Legendre Jr., Lead Engineer-Compliance at (603)
474-9521, extension 2373.

Very truly yours,

Ted C. Feigenbaum

Enclosures: NRC Forms 366, 366A

cc: Mr. Thomas T. Martin
Regional Administrator
United States Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Mr. Noel Dudley
NRC Senior Resident Inspector
P. O. Box 1149

Seabrook, NH 03874

INPO
Records Center
1100 Circle 75 Parkway
Atlanta, GA 30339

New Hampshire Yankee Division of Public Service Company of New Hampshire
P. O. Box 300 o Seabrook, NH 03874 o Telephone (603) 474-9521

*** END OF DOCUMENT ***
